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AMSAT NEWS SERVICE
ANS-113

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The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to: ans-editor [at] amsat [dot] org.

You can sign up for free e-mail delivery of the AMSAT News Service Bulletins via the ANS List; to join this list see: https://mailman.amsat.org/postorius/lists/ans.amsat.org/

ANS-113 AMSAT News Service Weekly Bulletins

To: All RADIO AMATEURS
From: Radio Amateur Satellite Corporation
712 H Street NE, Suite 1653
Washington, DC 20002

DATE 2023 Apr 23

Fox-Plus Progress Report

Recognizing the immense popularity of the original Fox series of satellites and their ability to introduce countless hams to amateur satellites, the AMSAT Board of Directors in 2021 approved the Fox-Plus program to carry Amateur Radio payloads into low-earth-orbit (LEO) and, specifically, to provide continued availability of entry level FM repeater satellites.

With Fox-Plus having a year-and-a-half of operation under its belt, AMSAT News Service thought it was a good time to check in with AMSAT Assistant VP – Engineering, Jonathan Brandenburg, KF5IDY for a report on its progress.

Jonathan reports, “The progress of the Fox -Plus team has been steady and is now accelerating thanks to a fresh influx of engineers who are now contributing to the team. We currently have ten engineers actively working on various aspects of this new generation of satellites. We have software engineers, electrical engineers, mechanical engineers, even system engineers working on testing and documentation. This is a solid team of engineers, some with a lifetime of experience and some still in college, but we can always use more.

“Our strategy is to build 20 or so satellites to have on-the-shelf and ready to fly. There are two

important facets to this approach. The first is the economy of scale and the second, perhaps more importantly, is the ability to take advantage of launch availabilities in a timely manner.

“As we close in on completed and tested designs, it is likely that we can launch our first bird, Fox-Plus Alpha, in early 2024. That date, of course, is dependent on the ability of our volunteer engineering staff to work on AMSAT projects while working their full-time jobs, fulfilling their responsibilities with their families, and taking the occasional moment to sit back and relax.”

“Fox-Plus Alpha will be a feature-packed bird combining commercially available and AMSAT developed hardware. In the interest of speeding up delivery time for our first satellite, certain components such as the space frame, electrical power module, solar panels and antennas will be commercially sourced. We are reusing the Improved Command Receiver and the Internal Housekeeping Unit for this flight. Over time, we will continue to improve our own ideas for electrical power systems and antennas. One example of this is the maximum power point tracker (MPPT), a device that extracts the maximum amount of power from the solar cells by adjusting the voltage to maximize the power curve.

“Although the basic mission of the Fox-Plus program is to fly FM repeater payloads, the Fox-Plus Alpha payload will utilize the previously flown linear transponder module (LTM) as used on Fox-1 Echo. The decision to fly a linear transponder payload was made for expedience reasons- to provide AMSAT members with a working Amateur Radio payload in the shortest time possible. A bird carrying an FM repeater will follow, but we are in need of an engineer to develop that board.

“Fox-Plus Alpha’s linear transponder will utilize a V/U configuration (VHF uplink – UHF downlink). There will also be a separate telemetry beacon that will leverage the ever-popular FoxTelem software. The battery chemistry will be lithium-based.

“Although we learned many things from the original Fox series satellites, one thing that sticks in my mind is the need to harden the transmitter circuity. Variations in the SWR caused by the state of the antenna deployment and other factors created difficulties in transmitter operation such as significantly reduced power output and even failure altogether. This is a priority for all Fox-Plus missions.

“After we have achieved our initial mission objectives, there are several improvements to the Fox-Plus series that we have planned, including:
- Radiation tolerant internal housekeeping unit (RT-IHU)
- Multi-channel FM repeater
- SSTV uplink and downlink
- Internally developed attitude determination and control capabilities, and a
- Packet system with store-and -forward capabilities already being developed by engineers participating in the Advanced Satellite Communications and Exploration of New Technology (ASCENT) initiative.

“After Fox-Plus Alpha, the future is not all that far away. Planned improvements to the Fox-Plus series of satellites include increased payload capabilities. We are exploring the opportunities to fly high-school and university level experiments as additional payloads. These possibilities may exist within a 1U spaceframe. But, adding robust science, technology, engineering and math (STEM) modules comes the need for increased volume and greater power generation and storage. Thus, the transition from 1U to 3U spaceframes seems inevitable, and even desirable.

“Looking at the big picture, the AMSAT Youth Initiative and Educational Relation programs have a front seat at the table for defining STEM missions. Our payload capabilities must meet their requirements for missions that generate wide participation and the serious benefit to youth education.”

[ANS thanks Jonathan Brandenburg, KF5IDY, AMSAT Assistant VP-Engineering for the above information.]

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- Cheesecake

Tickets ($60 each) may be purchased from the AMSAT store. The banquet ticket purchase deadline is Friday, May 12th. Banquet tickets must be purchased in advance and will not be sold at the AMSAT booth. There will be no tickets to pick up at the AMSAT booth. Tickets purchased on-line will be maintained on a list with check-in at the door at the banquet center. Seating is limited to the number of meals reserved with the Kohler caterers based on the number of tickets sold by the deadline.

The Kohler Presidential Banquet Center is located at 4548 Presidential Way, Kettering, Ohio – about 20 minutes away from the Greene County Fairgrounds.

[ANS thanks the AMSAT Hamvention Team for the above information.]

Changes to AMSAT-NA TLE Distribution for April 20, 2023

A SpaceX Falcon 9 Transporter-7 mission placed the following satellites carrying Amateur Radio into orbit on an April 15, 2023, at 02:48 a.m. Eastern time.

The following satellites have been added to this week's AMSAT-NA TLE distribution:

KILICSAT - NORAD Cat ID 56181 (uncoordinated frequency: 436.9000 MHz).
CIRBE - NORAD Cat ID 56188 (IARU coordinated frequency: 437.2500 MHz).
INSPIRE-SAT 7 - NORAD Cat ID 56211 (IARU coordinated frequencies: 435.2002 MHz and 437.4100 MHz).
ROSEYCUBESAT 1 - NORAD Cat ID 56212 (IARU coordinated frequency: 436.8252 MHz).

Thanks to Nico Janssen, PA0DLO for the NORAD Cat ID identification of the above satellites.

Two Line Elements or TLEs, often referred to as Keplerian elements or keps in the amateur community, are the inputs to the SGP4 standard mathematical model of spacecraft orbits used by most amateur tracking programs. Weekly updates are completely adequate for most amateur satellites. TLE bulletin files are updated Thursday evenings around 2300 UTC, or more frequently if new high interest satellites are launched. More information may be found at https://www.amsat.org/keplerian-elements-resources/.

[ANS thanks Ray Hoad, WA5QGD, AMSAT Orbital Elements Manager, for the above information.]

ARISS NEWS

Amateurs and others around the world may listen in on contacts between amateurs operating in schools and allowing students to interact with astronauts and cosmonauts aboard the International Space Station. The downlink frequency on which to listen is 145.800 MHz worldwide.

+ Upcoming Contacts

None listed.

+ Successful Contacts

West Michigan Aviation Academy, High School, Grand Rapids, MI, direct via W8ISS.
The ISS callsign was NA1SS.
The crewmember was Sultan Al Neyadi, KI5VTV.
The ARISS mentor was KD8COJ.
Contact was successful on Thursday, April 20, 2023.

Mohammad Bin Rashid Space Centre, Dubai, UAE, direct via A68MBR.
The ISS callsign was OR4ISS.
The crewmember was Sultan Al Neyadi, KI5VTV.
The ARISS mentor was ON6TI.
Contact was successful on Tuesday, April 18, 2023.

The latest information on the operation mode can be found at
https://www.ariss.org/current-status-of-iss-stations.html

The latest list of frequencies in use can be found at https://www.ariss.org/contact-the-iss.html

[ANS thanks Charlie Sufana, AJ9N, one of the ARISS operation team mentors for the above information.]

Upcoming Satellite Operations

None listed.

Hamfests, Conventions, Maker Faires, and Other Events

+ CubeSat Developers Workshop
  April 25-27, 2023
  Cal Poly, San Luis Obispo
  Performing Arts Center, 1 Grand Avenue, San Luis Obispo, CA 93405
  https://www.cubesatdw.org/

+ Dayton Hamvention
  May 19-21
  Greene County Fair and Expo Center, 210 Fairground Road, Xenia 45385
  https://hamvention.org/

+ TAPR/AMSAT Banquet
  May 19, 2023
  Kohler Presidential Banquet Center is located at 4548 Presidential Way, Kettering, Ohio
  Reservations are required and available at the AMSAT Store
  https://www.amsat.org/product-category/amsat-at-hamvention/.

+ AMSAT Symposium and Annual Meeting
  October 20-21, 2013
  Dallas, Texas

+ AMSAT Ambassadors provide presentations, demonstrate communicating through amateur satellites, and host information tables at club meetings, hamfests, conventions, maker faires, and other events.

AMSAT Ambassador Clint Bradford, K6LCS, says,

"Think a 75-minute presentation on "working the easy satellites" would be appropriate for your club or event? Let me know by emailing me at k6lcsclint (at) gmail (dot) com or calling me at 909-999-SATS (7287)!"

Clint has NEVER given the exact same show twice: EACH of the 150+ presentations so far has been customized/tailored to their audiences. An email message received after a recent presentation:

"I really enjoyed Clint's presentation last night. The fact that he had taken the time to research and know something about his audience and welcomed interaction made it very informative and enjoyable. This was a refreshing change from many canned YouTube presentations I've tried to watch, which were poorly done, fuzzy video or muddy audio, or a badly prepared presenter stumbling his way through, with any valuable info lost along the way. Thanks for hooking this one up."

[ANS thanks Clint Bradford, K6LCS, and the AMSAT Events page for the above information.]

Satellite Shorts From All Over

+ The Providence Radio Association, W1OP will attempt SSB and FM satellites QSO's from the Alan S.

Feinstein Middle School, in Coventry, RI on April 27, 2023. This will be part of a presentation on ham radio to about 350 students in their 8th grade STEM program. N1DM will be the operator and will attempt to work any available satellites during the demo portion of the program which will occur somewhere in the period of 1245 to 1425 UTC. W1OP/N1DM requests if you make a QSO in addition to call and grid square you give your state.[ANS thanks Dom Mallozzi, N1DM for the above information.]

+ $50Sat, also known as EAGLE-2, is an open-source, PocketQube satellite project that was designed to demonstrate the feasibility of building and launching a functional satellite for just $50. The project was launched in 2013 with the goal of providing a simple and low- cost platform for educational and amateur space missions. $50Sat is equipped with a basic communications system, including a UHF/VHF transceiver, a microcontroller and a simple power system. The satellite is based on a modular design, which makes it easy to modify and customize for different missions. One of the key innovations of $50Sat is the use of Commercial-Off-The Shelf (COTS) components, such as a cellphone battery and a Bluetooth module, all of which helps to lower costs. The satellite also leverages a number of open-source hardware and software tools, making it easier for others to build their own satellites based on the $50Sat design. For more ideas on PocketQubes, see http://satmagazine.com/story.php?number=1780991041. [ANS thanks satmagazine.com for the above information.]

+ 'Look what I found!' Hours after the first test flight of SpaceX's Starship ended with the spacecraft and its Super Heavy booster tumbling until it was commanded to explode, possible debris from the colossal rocket began to wash up on the shores surrounding the company's Starbase launch facility in Boca Chica, Texas. Photos shared on social media showed that more than one person had come across small fragments of the black and white ceramic tiles from the Starship. Though the Starship test flight was a privately funded activity, it was conducted under a Federal Aviation Administration launch license asserting it was being undertaken with the oversight of the United States. As a party to the Outer Space Treaty of 1967, protections are extended that any spacecraft components found anywhere on Earth (or in space) remain the property of the launch operator until such time that the entity explicitly relinquishes them. As such, all of the Starship debris remains SpaceX's property, even if it is found on private property or in the Gulf of Mexico. [ANS thanks space.com for the above information.]

Join AMSAT today at https://launch.amsat.org/

In addition to regular membership, AMSAT offers membership to:

* Societies (a recognized group, clubs or organization).
* Primary and secondary school students are eligible for membership at one-half the standard yearly rate.
* Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status.
* Memberships are available for annual and lifetime terms.

Contact info [at] amsat.org for additional membership information.

73 and remember to help Keep Amateur Radio in Space!

This week's ANS Editor, Frank Karnauskas, N1UW
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